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14 April 2023

Mr. Michael Lhotte, President
LOTREC Games
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Orange, PACA 84100 France

Scope: Mathematical Analysis of *LOTREC I*, *LOTREC II*, and *LOTREC III*

File Number: LO-394-LTG-23-01

Evaluating Location
GLI-1

Nevada Registration Number: 31668-01

Dear Mr. Lhotte,

As per LOTREC Game's request, please find **Gaming Laboratories International, LLC's (GLI)** analysis of the table game *LOTREC I*, *LOTREC II*, and *LOTREC III* to be submitted to and reviewed by the Nevada Gaming Control Board for determination as to its suitability.

Game Description

LOTREC I

LOTREC I is a table game played with 12 Lotrec decks. A Lotrec deck consists of 24 cards. Each of these cards contain an image of a colored shape. There are four shapes: Circle, Star, Square, and Triangle. Each of these shapes are colored Blue, Yellow, Black, Red, Green, or White.

The players place their wagers on a Lotrec I Layout. The betting options are explained below. Play commences once all wagers are placed. Then, four cards are dealt. The dealer checks the cards to see if there is a majority of shapes and a majority of colors. If so, the combination of these two forms the winning result. A majority must be unique in that there can't be multiple of the same amount. For example, if there are 2 Red shapes and 2 Blue shapes, there is no majority. If there are 2 Red shapes, 1 Blue shape, and 1 Yellow shape, then Red is the majority.

Using a Lotrec I Layout, the player may place any or multiple of the following bets:

- **Straight Up:** A single colored shape is the winning result. For example, a Green Star.
- **Split:** One of two adjacent colored shapes is the winning result. For example, a Red Square and a Black Star.
- **Corner:** One of four adjacent colored shapes is the winning result. For example, a White Circle, a Green Triangle, a Red Circle, and a Black triangle
- **Horizontal:** One of four colored shapes in a single, horizontal line is the winning result. For example, a Red Square, a Black Star, a Red Circle, and a Black Triangle.
- **Vertical:** That there is a winning result of a particular shape with any color. For example, all Triangles.
- **Color Majority:** That there is a majority of colors but not of shapes. For example, Blue Square, Blue Triangle, Red Star, and Yellow Circle.
- **Shape Majority:** That there is a majority of shapes but not of colors. For example, Blue Star, Green Star, Yellow Star, and Black Circle.
- **No Majority:** That there is not a majority of either shapes or colors. For example, Blue Star, Green Star, Red Circle, Yellow Circle.

The pays for these can be found in [Table 1](#) and [Table 2](#). Note that *LOTREC I* is played with sets of two chips where the chips in each individual set are of equal value.

Table 1. LOTREC I – Inside Bets

Wager	Pay
Straight Up	92 to 2
Split	44 to 2
Corner	22 to 2

Table 2. LOTREC 1 – Outside Bets

Wager	Pay
Horizontal	14 to 2
Vertical	22 to 2
Color Majority	11 to 2
Shape Majority	5 to 2
No Majority	22 to 2

LOTREC II

LOTREC II is a table game played with 12 Lotrec decks and four six-sided dice. A Lotrec deck consists of 24 cards. Each of these cards contain an image of a colored shape. There are four shapes: Circle, Star, Square, and Triangle. Each of these shapes are colored Blue, Yellow, Black, Red, Green, or White. Three of the dice contain each of the six colors. The fourth dice contains the four shapes as well as MC and MS symbols that represent Majority of Colors and Majority of Shapes, respectively.

If the MC or MS symbol lands, the player's hand will be checked for a majority. A majority means the color or shape that is of the highest count. A majority must be unique in that there can't be multiple of the same amount. For example, if there are 3 Red shapes and 3 Blue shapes, there is no majority in color. If there are 3 Red shapes, 2 Blue shapes, and 1 Yellow shape, then Red is the majority in color.

To initiate the game, the player places a wager to obtain six cards which are placed on a Lotrec II Layout. Then, the four dice are rolled. Depending on the outcome of the dice, the game pays out for different events.

- **MC symbol.** If the MC symbol lands, then the three dice with colors on them have no effect on the game. If the player has a majority of 3 or more of any color, they win.
- **MS Symbol.** If the MS symbol lands, then the three dice with colors on them have no effect on the game. If the player has a majority of 3 or more of any shape, they win.
- **Shape and Three Colors.** If a shape and three different colors land on the dice, then the player wins if at least one of their six cards matches any of the shape and color combinations on the dice.
- **Shape and a Color Majority.** If a shape lands and a color lands two or three times, then that shape and color form the winning combination. The player wins if at least one of their cards matches the winning combination.

The pays for each of these events is listed in [Table 3](#). Note that *LOTREC II* is played with sets of four chips where the chips in each individual set are of equal value.

Table 3. LOTREC II – Paytable

Event	Pay
Majority of Colors	7 to 4
Majority of Shapes	5 to 4
Shape and a Color Majority	7 to 4
Shape and Three Colors	4 to 4

LOTREC III

LOTREC III is a table game played with two six-sided dice. One of the dice has a color on each of its sides: Blue, Black, White, Red, Green, and Yellow. The other dice has a shape on each of its sides: Square, Hourglass, Circle, Star, Triangle, and Double-Ring. The player places their bets on a Lotrec III Layout. A win is awarded depending on the outcome of the two dice. It is allowable for the player or dealer to roll the dice.

- **Straight Up:** Bet on a specific combination of shape and color, besides the Double-Ring shape. For example, Blue Star.
- **Split:** Bet on two adjacent colored shapes. For example, Green Hourglass and White Circle.
- **Corner:** Bet on four adjacent colored shapes. For example, Black Circle, Red Star, White Circle, and Green Star.
- **Horizontal:** Bet on a row containing 5 distinct colored shapes. For example, Green Square, White Hourglass, Green Circle, White Star, and Green Triangle.
- **Vertical:** Bet on a column containing all colors of a particular shape. For example, all Triangles.
- **Double Ring:** Bet on the Double-Ring shape appearing. Note that the die with colors on it has no bearing on this outcome.

The pays for each of these wagers is presented in [Table 4](#) and [Table 5](#). Note that *LOTREC III* is played with sets of four chips where the chips in each individual set are of equal value.

Table 4. LOTREC III – Inside Bets

Wager	Pay
Straight-Up	139 to 4
Split	67 to 4
Corner	31 to 4

Table 5. LOTREC III – Outside Bets

Wager	Pay
Horizontal	24 to 4
Vertical	19 to 4
Double Ring	19 to 4

Mathematical Analysis

The math analysis for *LOTREC I* was performed via a program that iterated over all possible combinations of cards. This was used to collect the probabilities, Return to Player (RTP), and House Edge (HE) in [Table 6](#) and [Table 7](#).

Table 6. LOTREC I – Inside Bets Summary

Wager	Probability	RTP	HE
Straight Up	0.0206485	97.05%	2.95%
Split	0.0412969	94.98%	5.02%
Corner	0.0825939	99.11%	0.89%

Table 7. LOTREC I – Outside Bets Summary

Wager	Probability	RTP	HE
Horizontal	0.1238908	99.11%	0.89%
Vertical	0.0825939	99.11%	0.89%
Color Majority	0.1527987	99.32%	0.68%
Shape Majority	0.2690685	94.17%	5.83%
No Majority	0.0825695	99.08%	0.92%

The math analysis for *LOTREC II* was performed via a program that iterated over all possible combinations of cards and dice outcomes. The results were used to generate the probabilities in [Table 8](#).

Table 8. LOTREC II – Probabilities

Event	Probability
Majority of Colors	0.0583208
Majority of Shapes	0.1021019
Shape and a Color Majority	0.0672995
Shape and Three Colors	0.2053991

The probabilities were combined with the pays to obtain an RTP of 98.60% and HE of 1.40%.

The math analysis for *LOTREC III* was conducted via theoretical calculations in a spreadsheet. The probabilities, RTP, and HE can be found in [Table 9](#) and [Table 10](#).

Table 9. LOTREC III – Inside Bets Summary

Wager	Probability	RTP	HE
Straight Up	0.0277778	99.31%	0.69%
Split	0.0555556	98.61%	1.39%
Corner	0.1111111	97.22%	2.78%

Table 10. LOTREC III - Outside Bets Summary

Wager	Probability	RTP	HE
Horizontal	0.1388889	97.22%	2.78%
Vertical	0.1666667	95.83%	4.17%
Double Ring	0.1666667	95.83%	4.17%

Summary

For LOTREC I, the maximum RTP is 99.32% from wagering on a Color Majority, and the minimum RTP is 94.17% from wagering on a Shape Majority. For LOTREC II, the RTP is 98.60%. For LOTREC III, the maximum RTP is 99.31% from wagering on a Straight Up bet-type, and the minimum RTP is 95.83% from wagering on a Vertical or Double Ring bet-type.

Concerns Identified:

The following concerns were raised during the evaluation of the aforementioned game. The details are as follows:

- NONE

Conclusion

Gaming Laboratories International, LLC attests that it has reviewed the mathematics of the game as submitted by LOTREC Games, and has performed an independent review of the game play to confirm that the submission documents are accurate.

Please visit [Gaminglabs.com](https://www.gaminglabs.com) to view the applicable Terms and Conditions and GLI Product Certification Scheme.

It is declared and affirmed under penalty of perjury that to the best of GLI's knowledge and belief, the GLI certification process was conducted in accordance with Nevada Gaming Control Board's (NGCB) requirements and that the product being certified in this Report meets the requirements of the Nevada Gaming Control Act and all regulations, technical standards, control standards and procedures, policies, and industry notices implemented or issued by the NGCB.

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Should you have any questions or need any additional information, please feel free to contact our office.

Sincerely,

GAMING LABORATORIES INTERNATIONAL, LLC

A handwritten signature in black ink, appearing to read 'CM Gallo', written over a light blue horizontal line.

Christine M. Gallo

Senior Vice President, Quality and Technical Compliance

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APPENDIX I

Nevada Test Cases Evaluated and Test Results:

Test Cases Relating to Return Percentage:

Test Case	Version	Test Results
14.040.1 (a)	1.0	Pass ①

① Please note that the test case listed above is related to Gaming Devices and may factor into determination of suitability for Nevada.